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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,419	02/10/2004	Ashish Tiwari	SRI 4840-2	9732

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EXAMINER	
PIERRE LOUIS, ANDRE	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/775,419	TIWARI ET AL.	
	Examiner	Art Unit	
	Andre Pierre-Louis	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10 February 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 10042004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-9 have been presented for examination.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

A process that consists solely of the manipulation of an abstract idea is not concrete or tangible. See In re Warmerdam, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed.Cir. 1994). See also Schrader, 22 F.3d at 295, 30 USPQ2d at 1459. Office personnel have the burden to establish a prima facie case that the claimed invention as a whole is directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result. Only when the claim is devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. 101. Compare Musgrave, 431 F.2d at 893, 167 USPQ at 289; In re Foster, 438 F.2d 1011, 1013, 169 USPQ 99, 101 (CCPA 1971). Further, when such a rejection is made, Office personnel must expressly state how the language of the claims has been interpreted to support the rejection. The subject matter courts have found to be outside the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena. While this is easily stated, determining whether an applicant is seeking to patent an abstract idea, a law of nature or a natural phenomenon has proven to be challenging. These three exclusions recognize that subject matter that is not a practical application or use of an idea; a law of nature or a natural phenomenon is not patentable. See, e.g., Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874) ("idea of itself is not patentable, but a new device by which it may be made practically useful is"); Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86, 94, 40 USPQ 199, 202 (1939) ("While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."); Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759 ("steps of locating' a medial axis, and `creating' a bubble hierarchy . . . describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic abstract idea' "). Thus, a claim to an "abstract idea" is nonstatutory because it does not represent a practical application of the idea, not because it would preempt the idea.

2.1 Claims 1-9 are rejected under 35 U.S.C. 101 because the claimed invention merely directed to an abstract idea. Furthermore, the claims do not produce a useful, concrete, tangible result provided in the claimed invention. ***See MPEP 2106 [R2]***

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.0 Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Bultan et al. (ACM Transaction 1999, Model-checking of Concurrent Systems with Unbounded Integer Variable: Symbolic Representations, Approximation, and Experimental Results).

3.1 In considering claim 1, Bultan et al. teaches the functional equivalence of a method of constructing an abstract discrete system suitable for formal analysis from a hybrid system, with respect to a property of interest, said method comprising the steps of: a) selecting a set of polynomials from the polynomials contained in the property of interest and the hybrid system *(pg.751-753)*; b) saturating the selected set of polynomials *(pg.751-753);* c) constructing the abstract discrete system over a set of abstract states defined by the positive, negative and zero valuation of the saturated set of polynomials *(pg.751-753).*

3.2 As per claim 2, Bultan et al. teaches that the step of saturating the selected set of polynomials is stopped before normal termination *((pg.142-146).*

3.3 As per claim 3, Hsieh et al. teaches that the hybrid system has no discrete components *(pg. 752, 764-768).*

3.4 As per claims 4, Bultan et al. teaches that eigenvectors are used to generate polynomials *(pg. 762-768).*

3.5 With regards to claim 5, Bultan et al. teaches the functional equivalence of a method for determining the validity of a property of interest with respect to a hybrid system, said method comprising the steps of: a) abstracting the hybrid system to create an abstract discrete system *(pg.751-753);* b) analyzing the validity of the property of interest with respect to the abstract discrete system *(751-753 and 764-768).*

3.6 Regarding claim 6, Bultan et al. teaches that the property of interest is invalid with respect to the abstract discrete system, creating a finer abstraction of the hybrid system and analyzing the property of interest with respect to the finer abstraction *(pg.751, 760-773).*

3.7 As per claim 7, Bultan et al. teaches that analyzing the validity of the property of interest is performed by model checking *(see title, pg.752).*

4.0 Claim 1 is further rejected under 35 U.S.C. 102(b) as being anticipated by Hsieh et al. (IEEE 1998, Model abstraction for formal verification).

4.1 In considering claim 1, Hsieh et al. teaches the functional equivalence of a method of constructing an abstract discrete system suitable for formal analysis from a hybrid system, with respect to a property of interest, said method comprising the steps of: a) selecting a set of polynomials from the polynomials contained in the property of interest and the hybrid system *(pg.140-143)*; b) saturating the selected set of polynomials *(pg.140-143);* c) constructing the abstract discrete system over a set of abstract states defined by the positive, negative and zero valuation of the saturated set of polynomials *(pg.140-143).*

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5.0 Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bultan et al., as applied to claims 1-7 above, in view of Lincoln et al. (USPG_PUB No. 2003/0033126).

5.1 Regarding claims 8-9, Bultan et al. teaches most of the instant invention; however, he does not expressly teach that the hybrid system is a model of a biological system. Lincoln et al. substantially teaches that the hybrid system is a model of a biological system (see Title). Lincoln et al. and Bultan et al. are analogous art because they are from the same field of endeavor and that the model analyses by Lincoln et al. is similar to that of Bultan et al. Therefore, it would have been obvious to one ordinary

skilled in the art at the time of the applicant's invention to combine the biological system modeling of Lincoln et al. with the Model checking system of Bultan et al. because Lincoln teaches the advantage of decision diagram for efficiency manipulation and representation and the improvement of efficiency (para 0090).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6.1 Geist et al. (U.S. Patent No. 6,957,404) teaches a model checking with layered localization reduction.

7. Claims 1-9 are rejected and this action is non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre Pierre-Louis whose telephone number is 571-272-8636. The examiner can normally be reached on Mon-Fri, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

October 27, 2006

APL

10/30/06

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